NON-PUBLIC?: N
ACCESSION #: 8811210111
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 1 PAGE: 1 OF 6

DOCKET NUMBER: 05000456

TITLE: Reactor Trip Due to 1C Reactor Coolant Pump Trip as a Result of Breaker Malfunction Due to Programmatic Deficiency
EVENT DATE: 10/16/88 LER #: 88-022-00 REPORT DATE: 11/10/88

OPERATING MODE: 1 POWER LEVEL: 096

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Freddie Ramos, Technical Staff Engineer TELEPHONE: 815 458 2801 Ext. 2487
COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 2021 on October 16, 1988, a potential transformer failure on an offsite 138 Kv line caused a line trip followed by a pole disagreement on a 345 Kv yard breaker in the Braidwood switchyard and resulted in a loss of off site AC power feed capability to Unit One. A blocked relay contact associated with the 1C Reactor Coolant Pump (RCP) allowed it to trip on instantaneous overcurrent during the bus transfer. This resulted in a reactor trip on RCP Low Flow Above 30% power and was followed by a turbine/generator trip as designed. Off site AC power was restored and normal hot standby conditions were established. The 345 Kv yard breaker was retimed to within acceptable tolerance. The potential transformer on the off site 138 Kv line has been replaced and the line returned to service. The relay block associated with the 1C RCP has been removed. Unit One 6.9 Kv and 4 Kv busses have been visually inspected for blocks. No blocks were found in any of the inspected relays. Additional administrative controls on the use and removal of blocks and/or jumpers on relays during periodic protective relay calibration have been issued. Additional emphasis and guidance on timely restoration of off site power has been given. There have been no previous occurrences of a loss of off site power due to a line perturbation.

END OF ABSTRACT

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 1; Event Date: October 16, 1988; Event Time: 2021 hrs;

Mode: 1 - Power Operation; Rx Power: 96%;

RCS AB! Temperature/Pressure: 584 degrees F/2235 psig

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of the event which contributed to the severity of the event.

345 Kv line 2002 connects Braidwood to step down transformer 83 at Davis Creek Substation (Davis Creek).

October 16, 1988

At 2021, the phase 'A' potential transformer for 138 Kv line 8604 failed which caused a current surge on the low side of transformer 83. This caused the sudden pressure relay for transformer 83 to actuate, which resulted in a Transfer Trip signal to be sent to the 345 Kv breakers associated with line 2002 at both Braidwood Station and Davis Creek. Braidwood 345 Kv oil circuit breaker (OCB) 7-8 and air circuit breaker (ACB) 7-11 opened as designed. However, 345 Kv OCB 4-7 took longer to open and a Pole Disagreement actuation resulted. This caused the Local Breaker Backup (LBB) system to open 345 Kv ACB 3-4, which resulted in 345 Kv power being removed from the high side of Station Auxiliary Transformers (SATs) EA! 142-1 and 142-2. The automatic bus transfer for 6.9 Kv busses 158 and 159 occurred as designed following closure of ACBs 1581 and 1591. The 1A and 1B Emergency Diesel Generators EK! started and sequentially loaded upon loss of 4 Kv busses 141 and 142 as designed. The 1C reactor coolant pump (RCP) AB! supply breaker, on bus 158, tripped on instantaneous overcurrent upon closure of ACB 1581. This caused the 2 out of 3 coincident logic signal for RCP 1C Flow Low Alert to be sent to Solid State Protection System (SSPS) JG! and resulted in a reactor trip on RC Pump Low Flow Above 30% power. The reactor trip was followed by a turbine/generator trip (TG,) TB!. When 345 Kv OCB 7-8 and ACO 1-8 opened, the voltage on the Unit Auxiliary Transformers (UATs) 141-1 and 141-2 began to decay. This caused a loss of power to 6.9 Kv busses 156, 157, 158, and 159, as well as 4 Kv busses 143 and 144. As a direct result of this event on Unit One, the station air

compressors (IA) LD! tripped and instrument air header pressure started to decrease.

At 2029, the Commonwealth Edison Southern Division Load Dispatcher (LD) stated that an unknown problem existed at Davis Creek. The Shift Engineer (SE) informed the LD that 345 Kv ACB 3-4 opened due to a pole disagreement on 345 Kv OCB 4-7 and that it was open. The SE requested permission from the LD to close 345 Kv ACB 3-4 for the purpose of reenergizing the Unit One SATs. The LD denied the request because the status of the grid had not been verified.

At 2037, 4 Kv bus 143 was energized from bus 141 to restore two banks of pressurizer heaters to allow recovery of RCS pressure to its normal operating value.

At 2054, 4 Kv bus 144 was energized from bus 142.

At 2058, the SE classified the event in accordance with the Generating Station Emergency Plan (GSEP) as an Unusual Event.

At 2110, appropriate notification of the Unusual Event was made to the Illinois Emergency Services Disaster Agency (ESDA), via the Nuclear Accident Reporting System (NARS),Pursuant to Emergency Action Level 10 - Loss of all offsite AC power required for a unit.

At 2112, line 2002 and unit main power transformer disconnects were opened at the request of the LD. The SE requested permission from the LD to close 345Kv ACB 3-4 for the purpose of reenergizing the Unit One SATs. The LD denied the request a second time because he still did not know the cause of the line trip.

The appropriate NRC notification via the ENS phone system was made at 2118 pursuant to 10CFR50.72(b)(2)(ii) and the GSEP Unusual Event.

At 2156, the LD gave permission to close 345 Kv ACB 3-4. The Unit One SATs were
nergized restoring offsite AC power.

At 2215, 345 Kv ACB 1-8 was closed as requested by the LD to start restoration of the 345 Kv ring bus on Unit One.

At 2216 an attempt to close 345 Kv OCB 7-8 was made. The attempt was unsuccessful as a result of the pole disagreement.

At 2217, following reset of the pole disagreement alarm, 345 Kv OCB 7-8 was closed to continue restoration of the 345 Kv ring bus on Unit One. Also, an attempt to make the Illinois ESDA one hour update call was placed on HOLD and subsequently disconnected at 2221.

At 2219, 4 Kv busses 143 and 144 were re-energized from the SATs to restore the normal offsite power lineup to Unit One.

At 2220, an attempt to close 345 Kv OCB 4-7 was made. The attempt was unsuccessful as a result of the pole disagreement.

At 2221, Commenced Illinois ESDA notification via outside phone lines for one hour update and to reclassify Unusual Event to Terminate Conditions. Notification completed at 2247.

At 2226, 6.9 Kv bus 159 was energized from the SATs in preparation for establishing RCS flow using 1D RCP.

At 2232, busses 156, 157, and 158 were energized from the SATs to place the Start-up Feedwater Pump on line and start the other RCPs.

At 2244, the 1D RCP was started to establish forced flow through the reactor core in preparation for establishing normal hot standby conditions.

The appropriate NRC notification via the ENS phone system was made at 2308 to provide followup notification pursuant to 10CFR50.72(c)(1)(iii) - A termination of the Emergency Classes. Also, to provide notification of the loss of the Unit Two Process computer pursuant to 10CFR50.72(b)(i)(v) - Any event that results in a major loss of emergency assessment capability, off site response capability, or communications capability.

At 2354, SAT 142-1 paralleled to 4 Kv bus 142 to continue restoration of normal offsite AC power.

At 2357, the 1B Diesel Generator was stopped and placed in STANDBY.

At 0001, SAT 142-1 paralleled to 4 Kv bus 141 to continue restoration of normal off site AC power.

At 0004, the 1A Diesel Generator was stopped and placed in STANDBY.

At 0008, 1C RCP started for establishing normal hot standby conditions.

At 0132, 1B RCP started for establishing normal hot standby conditions.

At 0149, 1A RCP started which established normal hot standby conditions. At 0155, 345 Kv OCB 7-8 and ACB 1-8 were opened, as directed by the LD, in preparation for restoration on line 2002.

At 0201, line 2002 disconnect was closed.

At 0210, 345 Kv OCB 7-8 and ACB 1-8 were closed, establishing normal breaker lineup. Additionally, another attempt to close 345 Kv OCB 4-7 was made. The attempt was unsuccessful as a result of the pole disagreement.

Operator actions decreased the severity of the event by restoring the instrument air system and minimizing the effects of the Unit Two operations.

This event is being reported pursuant to 10CFR50.73(A)(2)(iv) - Any event or condition that resulted in manual or automatic actuation of any engineered safety feature, including the reactor protection system.

C. CAUSE OF EVENT:

The cause of the loss of line 2002 was due to a failure of the phase 'A' potential transformer for 138 Kv line 8604 at Davis Creek. This caused a current surge on the low side of transformer 83, which resulted in its sudden pressure relay to actuate. This caused a transfer trip signal to be sent to the 345 Kv breakers associated with line 2002 at both Braidwood Station and Davis Creek.

The cause of the loss of power to the SATs was improper time between opening for the different phase poles for 345 Kv OCB's 4-7 adn 7-8, which resulted in a Pole Disagreement actuation. This caused the LBB system to open 345 Kv ACB 3-4, which resulted in 345 Kv power removed from the high side of SATs 142-1 and 142-2.

The cause of the reactor trip was the result of the 1C RCP supply breaker, on 6.9 Kv bus 158, tripping on instantaneous overcurrent. This was caused by a piece of cardboard inserted in the 1C RCP breaker instantaneous overcurrent relay bypassing the 5-6 cycle time delay. It is suspected that the cardboard was inserted during the last maintenance on the relay as a relay block. This is considered to be a programmatic deficiency in that no mechanisms existed to ensure that relay blocks were removed following maintenance activities.

D. SAFETY ANALYSIS:

There was no effect on plant or public safety. All systems operated as designed in response to the loss of off site AC power to Unit One. Restoration of off site power was done in a controlled manner following verification of the cause of the initiating event at Davis Creek.

Under worst case conditions of a Loss of Coolant Accident coincident with the loss of off site AC power, there would have been no effect on plant or public safety as this event is enveloped in the Final Safety Analysis Report (FSAR).

Off site AC power remained available to Unit 2 throughout the event. The Unit 1 emergency diesel generators started and supplied AC power as designed and the Unit Two emergency diesel generators were operable throughout the event.

E. CORRECTIVE ACTIONS:

Off site AC power was restored to Unit One as directed by the LD.

Unit One was placed in a Safe Shutdown condition.

The phase 'A' potential transformer for 138 Kv line 8604 at Davis Creek has been replaced and the line returned to service.

The sudden pressure relay actuation on transformer 83 at Davis Creek was reset.

Davis Creek to Braidwood Station 345 Kv line 2002 has been restored.

The piece of cardboard which was used as a block in the instantaneous overcurrent relay for the 1C RCP was removed.

Unit One relays for 6.9 Kv busses 156, 157, 158, and 159 have been visually inspected for blocks. No blocks were found in any of the inspected relays.

Unit One relays for 4 Kv busses 141, 142, 143, and 144 have been visually inspected for blocks. No blocks were found in any of the inspected relays.

The above two inspections will be conducted for the Unit 2 counterpart relays at the next opportunity. This will be tracked by Action Item 456-200-88-23701.

345 Kv OCB 4-7 and OCB 7-8 were tested for proper timing of opening of the phase breakers. Pole disagreement, time between the opening of the different phase poles, was found to be out of tolerance. They were recalibrated to bring the times within acceptable tolerance.

Additional administrative controls on the use and removal of blocks and/or jumpers on relays during periodic protective relay calibration have been issued to the Division Operational Analysis Department personnel.

Additional emphasis and guidance has been given to the Division LDs to ensure off site power is restored in a timely manner and the restoration of power has the highest priority.

F. PREVIOUS OCCURRENCES:

There have been previous occurrences of a loss of off site power which resulted in a reactor trip. The corrective actions were implemented addressing both root and contributing causes. Previous corrective actions are not applicable to this event.

G. COMPONENT FAILURE DATA:

This event was not caused by component failure at Braidwood Station nor did any components fail as a result of this event.

Commonwealth Edison
Braidwood Nuclear Power Station
Route #1, Box 84
Braceville, Illinois 60407
Telephone 815/458-2801

November 15, 1988
BW/88-1435

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv) and which requires a 30 day written report.

This report is number 88-022-00; Docket No. 50-456.

Very truly yours,

R.E. Querio
Station Manager

Braidwood Nuclear Station

REQ/AJS/jab
(7126z)

Enclosure: Licensee Event Report No. 88-022-00

cc: NRC Region Ill Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

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ACCESSION #: 8811210116